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Landsat 7 Operations Agreement (OA) Between the International Ground Stations (IGS) and Landsat 7

March 1998

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

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Preface

This document was written by the AlliedSignal Technical Services Corporation Landsat 7 Flight Operations Team (FOT). It is intended to formalize the Operational Agreements between Landsat 7 and the International Ground Stations (IGS) for the Landsat 7 Mission.

This document is under the configuration management of the Landsat 7 Project Configuration Control Board (CCB).

Configuration Change Requests (CCRs) to this document shall be submitted to the Landsat 7 Project CCB, along with supportive material justifying the proposed change. Changes to this document shall be made by document change notice (DCN) or by complete revision.

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Section 1. Introduction

1.1 Purpose

This document specifies and controls the operational interface between International Ground Stations (IGSs) and Landsat 7. Its purpose is to clearly define activities between the IGS operators and the Landsat 7.

This agreement will become effective upon approval and will remain in effect throughout the operations phase of the Landsat 7 mission. Any subsequent changes to this document must be mutually agreed upon by the NOAA Mission Management Office (MMO), on behalf of the IGSs, by the Distributed Active Archive Center (DAAC), and by the Landsat 7 FOT.

1.2 Scope

This Operational Agreement (OA) covers the operational interfaces between the MOC personnel and the IGS personnel and between the IGS personnel and the EROS Data Center (EDC) Distributed Active Archive Center (DAAC) personnel.

1.3 Reference Documentation

The latest version of the documents listed below were used as references for the development of this OA or can be used for further information.

a. Landsat 7 Detailed Mission Requirements (DMR) Document, 430-11-01-003-1

b. Landsat 7 to IGS ICD, 430-11-06-009

c. Landsat 7 Flight Operations Plan (FOP), ATSC, MOSDD-L7-FOP-002

d. IGS Memos of Understanding (available from the MMO)

e. DAAC Operations Plan (document number TBS)

1.4 Document Organization

This document consists of 10 sections:

Section 1 identifies the document purpose, scope, references, and organization.

Section 2 describes the facilities involved in the operational interfaces.

Section 3 addresses the Operational Responsibilities related to the MOC-IGS interface.

Section 4 addresses the Operational Responsibilities related to the MMO-IGS interface.

Section 5 addresses the Operational Responsibilities related to the DAAC-IGS interface.

Section 6 lists the relevant points of contact within the FOT and the conditions under which each should be used.

Section 7 lists the relevant points of contact within the IGS and the conditions under which each should be used.

Section 8 lists the relevant points of contact within the MMO and the conditions under which each should be used.

Section 9 lists the relevant points of contact within the DAAC and the conditions under which each should be used.

Section AB defines the abbreviations and the acronyms.

Section 2. Facilities Description

2.1 The Mission Operations Center (MOC)

The Landsat 7 MOC, located in Building 32 at GSFC, Greenbelt Maryland, is developed by NASA and provides the hardware and software systems necessary for the successful execution of real-time spacecraft operations and off-line scheduling and analysis activities. All command and control functions of the spacecraft take place from the MOC. From the MOC, the Flight Operations Team (FOT) ensures that spacecraft conditions are monitored and controlled. Along with ensuring the health and safety of the spacecraft, the FOT schedules and executes science data capture and retrieval. The FOT, using MOC tools, facilitates resource scheduling and interfaces with the appropriate elements required to conduct mission operations and meet the mission objective.

2.2 The Mission Management Office (MMO)

The Landsat Management Plan, signed by the tri-agency Landsat Program Management (LPM), has assigned management responsibility for Landsat 7 on-orbit operations to NOAA. To carry out its responsibility, NOAA has established the Mission Management Office (MMO) to plan and direct those activities. The MMO acts on behalf of the Landsat Coordinating Group (LCG), which consists of the senior agency officials of NASA, NOAA, and USGS who oversee the Landsat Program.

The Landsat 7 MMO is charged with implementation of the Landsat 7 Data Policy. In this capacity, the MMO is responsible for the day-to-day operations of the Landsat 7 System to fulfill that policy. The MMO establishes and maintains agreements with the IGSs for providing direct downlink Landsat 7 ETM+ data, provides for appropriate operational coordination, and acts as a point of contact for non-routine communications with the IGSs. Routine contacts with the IGSs are delegated by the MMO to the Landsat 7 FOT.

2.3 Distributed Active Archive Center (DAAC)

The Distributed Active Archive Center (DAAC) is an element of the Earth Observing System Data and Information System (EOSDIS). It is located in Sioux Falls, South Dakota, at the Earth Resources Observation System (EROS) Data Center (EDC). For Landsat 7, the DAAC archives Landsat 7 Level 0R data, metadata, and browse data. The DAAC supports users' queries and distributes data to users. It maintains an on-line library of metadata and browse data for Landsat 7. The IGSs send metadata and (optionally) browse data to the DAAC for inclusion in this library. The DAAC also maintains a library of calibration parameters and mission information for Landsat 7.

2.4 The International Ground Stations (IGSs)

In addition to downlinking X-band image data to U.S. facilities, the Landsat 7 spacecraft also downlinks image data to the IGSs. These stations receive real-time image data only as acquired within their acquisition circle. Each IGS signs a Memorandum of Understanding (MOU) with NOAA which specifies certain terms of agreement relating to the scheduling and operations affecting their access to image data downlinks. A list of possible IGSs is shown in Table 2-1.

Table 2-1: IGS List

SYMBOL	LOCATION	COMMENTS
COA	Argentina, Cordoba	
ASA	Australia, Alice Springs	scheduled through TBD
HOA	Australia, Hobart	scheduled through TBD
CUB	Brazil, Cuiaba	
GNC	Canada, Gatineau	scheduled through Ottawa
PAC	Canada, Prince Albert	scheduled through Ottawa
SGC	Chile, Santiago	
CPE	Ecuador, Cotopaxi	
NSG	Germany, Neustrelitz	scheduled through TBD
SGI	India, Shadnagar	
DKI	Indonesia, Parepare	
FUI	Italy, Fucino	scheduled through TBD
HAJ	Japan, Hatoyama	scheduled through TBD
KUJ	Japan, Kumomoto	scheduled through TBD
KLM	Malaysia, Kuala Lumpur	
ISP	Pakistan, Islamabad	
BJC	Peoples Rep. of China, Beijing	
RSA	Saudi Arabia, Riyadh	
JSA	South Africa, Johannesburg	
MPS	Spain, Maspalomas	(Seasonal) scheduled through TBD
KIS	Sweden, Kiruna	scheduled through TBD
CLT	Taipei, China, Chung-li	
BKT	Thailand, Bangkok	

Section 3. Operational Responsibilities - MOC

3.1 Products

During on-orbit operations, the IGSs request image acquisition via Service Requests sent to the Landsat 7 file server, located in the MOC. A unique user ID and password will be assigned to each IGS to access the MOC open server as part of the new station start-up procedure. The Service requests from the IGSs are ingested by the MOC Scheduling system, which incorporates them into the Scheduler acquisition request database. These requests are honored as system resources allow. If, for example, IGSs from various countries request data resulting in irreconcilable conflicts for resources (e.g., four IGSs asking for concurrent data downlinks using the satellite's three X-Band antennas), these conflicts are resolved in an equitable manner agreed to by the MMO and the IGSs. The Landsat 7 spacecraft's ETM+ sensor is duty cycle limited by thermal and power constraints which could also preclude the honoring of IGS imaging requests.

Several products are exchanged between the IGSs and the FOT in the MOC. Table 3-1 lists the product descriptions, timespans, and delivery frequency. The product numbers assigned to each product in Table 3-1 are utilized by the MOC for product accountability and tracking purposes only.

3.2 Use of Administrative Messages

The Administrative Message will be utilized by both the MOC and IGS stations to notify each center of anomalous conditions and to pass information not covered by other message types. The following list outlines the major reasons for which the MOC might send an Administrative Message:

a. Delay in Contact Schedule file updates

b. Notice of acquisitions not scheduled

c. Notice of Calibration Parameters File update

d. Notice of system and spacecraft status

The MOC will notify each IGS of a spacecraft contingency, spacecraft emergency, or planned maneuvers that affect imaging, using the Administrative Message. It is the responsibility of each IGS to poll the MOC server every day to ensure timely notification of possible non-imaging periods. For time critical messages, an e-mail version of the Administrative Message is sent to each IGS in addition to the message placed on the server. The e-mail address to be used is listed in Section 7.

Table 3-1: Product Descriptions - MOC / IGS

Product # and Description	From/ To	Product Description	Product Timespan	Delivery Frequency
3.03 STATION DESCRIPTION	IGSs to FOT	Provides FOT with information about ground station location and points of contact	Not Applicable (N/A)	Once before station startup, as baseline; updates as required, at least 7 days prior to effective date
3.02 RECEIVE ANTENNA HORIZON MASK	IGSs to FOT	Provides minimum elevation angles for unobstructed line of sight to satellite	N/A	Once before station startup, as baseline; updates as required, at least 7 days prior to effective date
3.09 SERVICE REQUEST	IGSs to FOT	Requests FOT to schedule transmission to ground station	Up to 10 imaging interval	At least 36 hours prior to start of requested acquisition(s)
1.11 CONTACT SCHEDULE	FOT to IGSs	Notifies the station of scheduled X-band on/off times	48 hours	After every scheduling run that included a request from that ground station
2.05 • IIRV • BME, NORAD	FOT to IGSs	• LS7 position and velocity vectors • LS7 orbital elements Both types are for ground station use in pointing to LS7	• nominally 72 hours or 96 hours • single vector	• Mondays, Wednesdays (72 hrs), and Fridays (96 hrs) • Daily
3.05 PROBLEM REPORT	IGSs to FOT	Used to report potential satellite related problems during downlink receipt	N/A	Within 24 hours of detection of problem
3.08 a &b resp. ADMINISTRATIVE MESSAGE	IGSs to FOT, FOT to IGSs	Free form information not covered by other messages/files	N/A	As needed
FORMATS Product Report	FOT to IGSs	Acknowledgment of receipt and ingest of IGS inbound files, and	N/A	Within 5 minutes of product receipt

		validation of service requests		
3.01 CALIBRATION PARAMETER FILE	FOT to IGSs	Provides geometric and radiometric parameters for image processing	Nominally 90 days	Once before launch, updates nominally every 90 days

3.3 Retrieval of Files From the MOC

Files to be sent to the IGSs are placed on the MOC open server in the appropriate IGS output directory. It is the responsibility of each IGS to log onto the Landsat 7 file server daily and retrieve any files generated for the station, including the Contact Schedule and IIRV/BME/NORAD files.

It is recommended that each IGS poll its directory on the MOC open server each day before the first contact with the satellite to ensure no updated Contact Schedules have been generated.

The FOT nominally places the updated Contact Schedule and vector files on the MOC open server within a set two-hour window each day. The two-hour window opens at 2000Z and closes at 2200Z every day during normal operations.

3.3.1 File Retrieval Instructions

The following are the steps to be followed in retrieving files from the MOC open server:

1. Establish an ftp connection to the host using the Domain name and IP address
2. Once connected, enter your User name and Password
3. Change to the directory specified in section 3.3.2 for your site and the file type you wish to retrieve
4. Use the ftp "get" command to retrieve files from the MOC
5. When you have finished, use the ftp "bye" command to exit from ftp

3.3.2 IP Address and Directory Information

The specific IP address and directory information to retrieve products from the MOC are:

a. Products Directories for:

Contact Schedule (1.11)
IIRV, BME, NORAD (2.05)
Calibration Parameter File (3.01)
Administrative Message from FOT (3.08b)

IP Address: (see section 3.5)

Domain Name: (see section 3.5)

User Name: **ID**

Password: (see section 3.5)

Directory Structure:
C:\LS7\ProductRepository\Outbound\Station**Country\ID**Products

Note: See table 3-2 for **Country** and **ID** values

b. Products Directories for:

FORMATS Product Report

IP Address: (see section 3.5)

Domain Name: (see section 3.5)

User Name: **ID**

Password: (see section 3.5)

Directory Structure:
C:\LS7\ProductRepository\Outbound\Station**Country\ID**Reports

Note: See table 3-2 for **Country** and **ID** values

3.4 Sending of Files to the MOC

Files to be sent to the MOC are transferred to the MOC open server using file transfer protocol (ftp) and are placed in the appropriate IGS input directory. There are a few timing considerations:

- The IGS Service Request message must be received by the MOC no later than 36 hours before the requested image acquisition start time(s).
- The MOC requires 7 days to incorporate Station Description changes.

The MOC software generates a FORMATS Product Report within 5 minutes of receipt of a file from an IGS. The Report acknowledges receipt and successful transfer of the IGS file into the MOC. It also reports on results of validating Service Request messages.

Table 3-2: Country and ID Directory Paths

Country	ID
Argentina	COA
Australia	ASA
Australia	HOA
Brazil	CUB
Canada	GNC
Canada	PAC
Ecuador	CPE
Germany	NSG
India	SGI
Indonesia	DKI
Italy	FUI
Japan	HAJ
Japan	KUJ
Malaysia	KLM
Pakistan	ISP
PeoplesRepublicofChina	BJC
SaudiArabia	RSA
SouthAfrica	JSA
Spain	MPS
Sweden	KIS
TaipeiChina	CLT
Thailand	BKT

3.4.1 File Transfer Instructions

The following are the steps to be followed in sending files to the MOC open server:

1. Establish an ftp connection to the host using Domain name and IP address
2. Once connected, enter your User name and Password
3. Change to the directory specified in section 3.3.2 for your site
4. Use the ftp "put" command to transfer files to the MOC
5. When you have finished, use the ftp "bye" command to exit from ftp

3.4.2 IP Address and Directory Information

The specific IP address and directory information to transmit products to the MOC are:

Product Directory for:

Receive Antenna Horizon Mask (3.02)
Station Description (3.03)
Problem Report (3.05)
Administrative Message from IGS (3.08a)
Service Request (3.09)

IP Address: (see section 3.5)

Domain Name: (see section 3.5)

User Name: **ID**

Password: (see section 3.5)

Directory Structure:
C:\LS7\ProductRepository\Inbound\Station**Country\ID**\Products

Note: See table 3-2 for **Country** and **ID** values

3.5 Handling of Sensitive Data

Sensitive data related to the interface between the MOC and the IGSs are the user account password, domain name, and IP address. These are specified in a separate attachment to this document. Each station, after signing on to become a Landsat 7 IGS, is send a private attachment containing the sensitive data items required by the IGS to access the MOC open server. The sensitive data is sent via a postal service and will not be sent electronically. The address provided by the IGSs in Section 7 is used.

Passwords will be updated periodically via an update to the attachment. The update will be sent in the same manner as the original attachment.

3.6 ftp Examples

3.6.1 Typical "put" ftp Session with the MOC

>ftp <*Enter Domain name here*>

Username: <*Enter User name here*>

Password: <*Enter Password here*>

>cd /LS7/ProductRepository/Inbound/Station/<*country name*>/<*3-letter station ID*>/Products

>put <*Filename*>

... once transfer is complete ...

>bye

3.6.2 Typical "get" ftp Session with the MOC

>ftp <*Enter Domain name here*>

Username: <*Enter Username here*>

Password: <*Enter Password here*>

>cd /LS7/ProductRepository/Outbound/Station/<*country name*>/<*3-letter station ID*>/Products

>put <*File name*>

... once transfer is complete ...

>bye

3.7 MOC Transfer Problem Resolution

There are several steps that can be taken if you are having problems:

1. Contact your local system administrator if you have any questions about your workstation/PC.
2. "Ping" the Landsat 7 MOC address to which you want to ftp. If you cannot ping the Landsat MOC, your workstation/PC is not correctly connected to the network and you should contact your local system administrator. If you are not familiar with ping, contact your local system administrator.
3. Initiate your ftp session with the MOC. If you can connect to the MOC, but cannot access the correct directory or cannot "put" or "get" files, contact the Landsat 7 FOT using the phone numbers in Section 6.

Section 4. Operational Responsibilities - MMO Interface

4.1 Introduction

The MMO is responsible for overseeing the Landsat 7 on-orbit operations after launch plus 90 days. The MMO is responsible for the day-to-day operations of the overall Landsat 7 system, from spacecraft to ground system, to fulfill the Landsat 7 Data Policy Plan. The MMO, acting on behalf of the Landsat Coordinating Group (LCG), interacts with the IGSs to establish and maintain operational agreement for direct downlink of Landsat 7 ETM+ data. The MMO provides operational coordination and resolve programmatic level issue to ensure the success of Landsat 7 Mission. The areas of the Landsat 7 to IGS interface in which the MMO has operational responsibilities include:

- Start-up of new stations
- IGS Memorandum of Understanding
- IGS Operations Agreement
- Billing and accounting
- Anomaly resolution
- Schedule conflict resolution

These are discussed in more detail in the following sections. The points of contact for the MMO are listed in Section 8.

4.2 Start-up of New Stations

The MMO provides to each new IGS the information required to implement a Landsat 7 data receiving and processing station. This information includes:

- Radio frequency (RF) interface description, including antenna frequencies and downlink specifications
- data and message formats, including interfaces back to the MOC and the DAAC
- hardware and software requirements imposed by data format or satellite design
- test data for use in station checkout

When an IGS signs up to become a Landsat 7 station, they are given the information required to access the servers at the MOC and the DAAC. This access will enable the exchange of test messages and test data files prior to the station coming on-line for routine operations. An important part of the start-up process is the submission of the Station Description and Receive

Antenna Horizon Mask messages by the IGS to the MOC. These messages enable the MOC and the DAAC to prepare for both testing and routine operations with the station.

4.3 IGS Memorandum of Understanding

Acting on behalf of the Landsat Coordinating Group (LCG), the MMO negotiates with the IGSs to establish and maintain operational agreements for direct downlink of Landsat 7 ETM+ data. The Memorandum of Understanding (MOU) is the formal vehicle for this bilateral agreement between NOAA and the IGS, detailing responsibilities for each party and any costs involved. The MMO works with the IGS to resolve any issues related to the MOU between the NOAA and the IGS.

4.4 IGS Operations Agreement

The MMO provides operational coordination and resolves programmatic level issues to ensure the success of the Landsat 7 mission. In this role, it acts on behalf of the IGSs in establishing an Operations Agreement (OA) with the three facilities that interface with the IGSs during operations: the MOC, the DAAC, and the MMO. The MMO is also the point of contact for non-routine communication with the IGSs. The IGSs are encouraged to first use the routine interface channels identified in the Operations Agreement to resolve any problem. These channels include the Problem Report, the Administrative Message, and direct contact with the FOT or DAAC.

4.5 Billing and Accounting

The MMO is responsible for setting up billing and accounting for access fees from the IGSs. Billing and accounting information is provided to the IGSs each quarter.

4.6 Anomaly Resolution

Any anomaly related to the direct downlink of Landsat 7 ETM+ data that cannot be resolved through the routine communications channels is directed to the MMO for resolution.

4.7 Schedule Conflict Resolution

It is very possible for conflicts to arise during the scheduling process due to resource constraints. For the most part, these can be dealt with fairly by the Mission Planners using the Scheduling System software. If for some reason a conflict occurs that cannot be fairly resolved by the Mission Planners, for example due to station request conflict or long term acquisition plan priority, the MMO provides a mutually agreeable resolution in accordance with the MOU and the OA.

4.8 Landsat 7 Ground Station Operators Working Group (LGSOWG)

The MMO organizes and chairs the LGSOWG in accordance with Section 2.C of the MOU. The IGSs designate their responsible representatives to participate in the LGSOWG. The LGSOWG convenes annually at a location determined by the LGSOWG and serves as a forum for exchange of programmatic, management, and technical information among ground station operators and the

MMO. Each IGS representative has an opportunity to provide a Station Status Report during the LGSOWG meeting. The content of the report includes, but is not limited to, the following:

a. Station Information: location, equipment, governing organizations, points of contact.

b. Current and Planned Data Acquisition Activities: Landsat 7 and other data the station is collecting or plans to collect.

c. Summary of Landsat 7 X-band downlink statistics and quality.

d. Statistical Summary of Acquired Landsat 7 Scenes: cloud cover percentages, user request rate and scene refresh rate.

e. Summary of the Station's Landsat 7 Data Archive: archive equipment and procedures, total number of scenes archived; percentage of good quality scenes with acceptable cloud cover and percentage of coverage of the IGS nation's landmass per season.

f. Landsat 7 Data Distribution Activities: how the system works, order interfaces, equipment, staff, customer information and support, data delivery summary by format and media.

Section 5. Operational Responsibilities - DAAC Interface

5.1 Products

There are two primary products (metadata and browse data) and six files associated with the transfer protocol.

The IGSs send metadata to the DAAC for all Landsat 7 data they receive and archive. In accordance with the Memorandum of Understanding (MOU), metadata is sent to the DAAC on at least a monthly basis. The IGSs may also send browse data to the DAAC if they don't have an online browse archive at their facilities.

The protocol for the electronic transfer of metadata to the DAAC comprises these three files:

- Product Delivery Record (PDR) - accompanies the product from the IGS to the DAAC and describes the source, contents, and internal labeling of the product.
- PDR Discrepancy - returned to the IGS from the DAAC only if a problem is found during ingest of the PDR; may also be called PDRD by the DAAC
- Production Acceptance Notification (PAN) - returned to the IGS from the DAAC to announce status of each submitted product file: whether successfully archived or if not, what errors were encountered.

The protocol for the physical media transfer of metadata and browse data to the DAAC comprises these three files:

- Physical Media Product Delivery Record (PMPDR) - accompanies the product from the IGS to the DAAC and describes the source, contents, and internal labeling of the product.
- Physical Media PDR Discrepancy - returned to the IGS from the DAAC only if a problem is found during ingest of the PDR; may also be called PMPDRD by the DAAC
- Physical Media Production Acceptance Notification (PMPAN) - returned to the IGS from the DAAC to announce status of each submitted product file: whether successfully archived or if not, what errors were encountered.

Table 5-1 summarizes the products and some of their characteristics.

Table 5-1: Product Descriptions - DAAC / IGS

Product	From/ To	Product Description	Delivery Medium	Delivery Frequency
Metadata	IGS to DAAC	Provides information about each ETM+ scene acquired	Electronic (ftp), Physical media	At least once a month
Browse data	IGS to DAAC	Reduced volume representation of an image scene used to determine general ground area coverage and spatial	Physical media	At least once a month

		relationships		
PDR	IGS to DAAC	Describes source, contents, and internal labeling of the product	Electronic (ftp)	Delivered with the metadata or browse data product
PDR Discrepancy	DAAC to IGS	Reports problems found during processing of the PDR	E-mail	As required
PAN	DAAC to IGS	Reports processing status for every metadata file submitted to the DAAC	E-mail	After ingest processing of each delivery
PMPDR	IGS to DAAC	Describes source, contents, and internal labeling of the product	Physical Media, Hard Copy	Delivered with the metadata or browse data product
PM PDR Discrepancy	DAAC to IGS	Reports problems found during processing of the PDR	E-mail	As required
PMPAN	DAAC to IGS	Reports processing status for every metadata and browse data file submitted to the DAAC	E-mail	After ingest processing of each delivery

5.2 Sending Electronic Files to the DAAC

Only metadata files are electronically transferred to the DAAC. The metadata file(s) and associated Product Delivery Record file are sent to the staging server from the IGS using file transfer protocol (ftp). They are placed in the appropriate IGS input directories.

The ECS operator can set a parameter indicating the number of attempts that will be made to pull data from the staging server before reporting a transfer error. This number is set at TBD.

5.2.1 File Transfer Instruction

The following are the steps to be followed in sending files to the DAAC staging server:

1. Establish an ftp connection to the host using Domain name and IP address
2. Once connected, enter your User name and Password
3. Change to the metadata directory specified in section 5.2.2 for your site
4. Use the ftp "put" command to transfer metadata files to the DAAC
5. Change to the PDR directory specified in section 5.2. for your site
6. Use the ftp "put" command to transfer the PDR file(s) to the DAAC
7. When you have finished, use the ftp "bye" command to exit from ftp

5.2.2 IP Address and Directory Information

The specific IP address and directory information to transmit files to the DAAC are:

a. Product Directory for:

Metadata files

IP Address: (see section 5.5)

Domain Name: (see section 5.5)

User Name: TBD

Password: (see section 5.5)

Directory structure: /IGS/META/**ID**/DATA

Note: See table 3-2 for **ID** values

b. Product Directory for:

PDR Files

IP Address: (see section 5.5)

Domain Name: (see section 5.5)

User Name: TBD

Password: (see section 5.5)

Directory structure: /IGS/META/**ID**/PDR

Note: See Table 3-2 for **ID** values

5.2.3 Typical "put" ftp Session with the DAAC

>ftp M0Cxxxx

Username: <*Enter Username here*>

Password: <*Enter Password here*>

>cd /IGS/META/<*3-letter station ID*>/DATA

>put <*File name*>

... once transfer of metadata files is complete ...

>cd /IGS/META/<*3-letter station ID*>/PDR

>put <*File name*>

... once transfer of PDR file(s) is complete ...

>bye

5.2.4 DAAC Transfer Problem Resolution

There are several steps that can be taken if you are having problems:

1. Contact your local system administrator if you have any questions about your workstation/PC.

2. "Ping" the DAAC address to which you want to ftp. If you cannot ping the DAAC, your workstation/PC is not correctly connected to the network and you should contact your local system administrator. If you are not familiar with ping, contact your local system administrator.

3. Initiate your ftp session with the DAAC. If you can connect to the DAAC, but cannot access the correct directory or cannot "put" files, contact the DAAC operations personnel using the phone numbers in Section 9.

5.3 Sending Physical Media to the DAAC

Both metadata files and browse data files are transferred to the DAAC via physical media. The options for media type are all tape. A browse data submission must include the associated metadata files. A single Product Delivery Record file is included on each tape.

In the event that a file check on the tape by the DAAC reveals that the PDR file is missing, DAAC operations personnel will contact the appropriate IGS operations personnel (in accordance with Section 7) and request a hard copy of the PDR be sent by facsimile to the DAAC. The facsimile phone number for the DAAC is listed in Section 9.

If a tape cannot be read at all, the DAAC operations personnel will notify the MMO and pass on to them any available details for use by the IGS in resolving the problem and submitting a replacement tape.

The information required on the paper label attached externally to the tape includes:

- Names of the files on the tape, in the order they were written to the tape
- Date of media shipment
- Unique media ID

The mailing address for sending physical media to the DAAC is in Section 9.

5.4 Receiving e-mail Files from the DAAC

Files are sent from the DAAC to the IGSs via e-mail. The actual file name of the PDR Discrepancy or PAN file is placed in the subject line of the e-mail message. The body of the e-mail message contains the file as defined in the Landsat 7 to IGS ICD.

The files sent from the DAAC contain dispositions of metadata and browse data files sent by the IGS for processing and archival at the DAAC. Tables 5-2 through 5-5 describe the appropriate actions to be taken by the IGS for each disposition defined in the Landsat 7 to IGS ICD for the four file types:

- Short PDR Discrepancy and short Physical Media PDR Discrepancy
- Long PDR Discrepancy and long Physical Media PDR Discrepancy
- Short PAN and short PMPAN
- Long PAN and long PMPAN

Table 5-2: Short PDR Discrepancy and Short Physical Media PDR Discrepancy - Appropriate IGS Actions for Reported Dispositions

Reported Disposition	Appropriate IGS Action
INVALID FILE COUNT	make sure the parameter TOTAL_FILE_COUNT agrees with the number of files being submitted with this PDR (do not include the PDR in your count); correct and resubmit the PDR and the original files
ECS INTERNAL ERROR	TBD
DATABASE FAILURES	TBD
INVALID PVL STATEMENT	check all statements in the PDR for correct format and syntax; correct and resubmit the PDR and the original files
MISSING OR INVALID ORIGINATING_SYSTEM PARAMETER	make sure the value for ORIGINATING_SYSTEM is set to **IGSxxx** where xxx is the 3-letter ID for your station as listed in Table 3-2; correct and resubmit the PDR and the original files
DATA PROVIDER REQUEST THRESHOLD EXCEEDED	TBD
DATA PROVIDER VOLUME THRESHOLD EXCEEDED	TBD
SYSTEM REQUEST THRESHOLD EXCEEDED	TBD
SYSTEM VOLUME THRESHOLD EXCEEDED	TBD

Table 5-3: Long PDR Discrepancy and Long Physical Media PDR Discrepancy - Appropriate IGS Actions for Reported Dispositions

TBS

Table 5-4: Short PAN and Short PMPAN - Appropriate IGS Actions for Reported Dispositions

TBS

Table 5-5: Long PAN and Long PMPAN - Appropriate IGS Actions for Reported Dispositions

TBS

5.5 Handling of Sensitive Data

Sensitive data related to the interface between the DAAC and the IGSs are the user account password, domain name, and IP address. These are specified in a separate attachment to this document. Each station, after signing on to become a Landsat 7 IGS, is sent a private attachment containing the sensitive data items required by the IGS to access to the staging server for metadata delivery. This sensitive data is sent via a postal service and will not be sent electronically. The address provided by the IGSs in Section 7 is used.

Passwords will be updated periodically via an update to the attachment. The update will be sent in the same manner as the original attachment.

Section 6. FOT Points of Contact

For mission scheduling problems, concerns, or questions, contact the following:

During prime shift (1200Z through 2300Z):

Michele Reeley	Mission Planner
Rich Lonigro	Mission Planner

Phone	(301) 614-5203 or (301) 614-5541
Pager	(301) 303-9284
FAX	(301) 614-5263
E-mail	Michele.Reeley@gsfc.nasa.gov
	Rich.lonigro@gsfc.nasa.gov
Mail Code	430.1
Address	GSFC/NASA
	Bldg. 32, Rm. C211
	Greenbelt MD, 20771

During off-shift hours (2300Z through 1200Z), contact:

Senior real-time engineer

Phone	(301) 614-5202

In all other cases, contact the Mission Management Office. (See section 8.)

Section 7. IGS Points of Contact

(The following information will be listed for each IGS.)

Country: _____
Station: _____
Name & Title: _____ (Administrative Manager)
Phone: _____
Fax: _____
E-mail: _____
Address: _____
_____
_____

Name & Title: _____ (Operation Manager)
Phone: _____
Fax: _____
E-mail: _____
Address: _____
_____
_____

Section 8. MMO Points of Contact

Name & Title: Jim Ellickson, Chief, Landsat Operation
Phone: 301-286-8311 or 301-457-5210
Fax: 301-457-5722
Pager: TBD
E-mail: jellickson@nesdis.noaa.gov
Address: 4700 Silver Hill Road
Washington DC 20233-9909
Mail Stop 9909

Name & Title: Kirk Liang, Flight Operation Manager
Phone: 301-286-8930
Fax: 301-614-5263
Pager: TBD
E-mail: kliang@nesdis.noaa.gov
Address: 4700 Silver Hill Road
Washington DC 20233-9909
Mail Stop 9909

Name & Title: Becky Farr, Ground Data Operations Manager
Phone: 301-286-3705
Fax: 301-614-5263
Pager: TBD
E-mail: rafarr@nesdis.noaa.gov
Address: 4700 Silver Hill Road
Washington DC 20233-9909
Mail Stop 9909

Section 9. DAAC Points of Contact

Mailing address for physical media:

USGS / EROS Data Center
Mundt Federal Building
Sioux Falls, SD 57198
Attn: Mike Benson, EDC DAAC Production and Distribution Manager

Regarding electronic transfer or physical media problems:

Name & Title: Mike Benson, EDC DAAC Production and Distribution Manager
Lyn Oleson, EDC DAAC Manager
Phone: 605-594-6938 or 605-594-6164
Fax: 605-594-6567
Pager: TBD
E-mail: benson@edcmail.cr.usgs.gov
Address: USGS / EROS Data Center
Mundt Federal Building
Sioux Falls, SD 57198

Regarding archive queries:

Name & Title: User Services
Phone: 605-594-6151
Fax: 605-594-6567
Pager: TBD
E-mail: TBD
Address: USGS / EROS Data Center
Mundt Federal Building
Sioux Falls, SD 57198

In all other cases, contact the Mission Management Office. (See section 8.)

Abbreviations and Acronyms

ATSC	AlliedSignal Technical Services Corporation
BME	Brower Mean Element
CCB	Configuration Control Board
CCR	Configuration Change Request
cd	Change Directory
DAAC	Distributed Active Archive Center
DC	District of Columbia
DCN	Document Change Notice
DMR	Detailed Mission Requirements
EDC	EROS Data Center
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observation System
ETM+	Enhanced Thematic Mapper Plus
FOP	Flight Operations Plan
FORMATS	Flight Dynamics Facility Orbital and Mission Aids Transformation System
FOT	Flight Operations Team
ftp	File Transfer Protocol
GSFC	Goddard Space Flight Center
ICD	Interface Control Document
ID	Identification
IGS	International Ground Stations
IIRV	Improved Interrange Vector
IP	Internet Protocol
LCG	Landsat Coordinating Group
LPM	Landsat Program Management
LS7	Landsat 7

MD	Maryland
MMO	Mission Management Office
MOC	Mission Operations Center
MOU	Memorandum of Understanding
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
NORAD	North American Air Defense
OA	Operations Agreement
PAN	Production Acceptance Notification
PC	Personal Computer
PDR	Product Delivery Record
PDRD	Product Delivery Record Discrepancy
PMPAN	Physical Media Production Acceptance Notification
PMPDR	Physical Media Product Delivery Record
PMPDRD	Physical Media PDR Discrepancy
PVL	Parameter Value Language
RF	Radio Frequency
SD	South Dakota
TBD	To Be Determined
TBS	To Be Supplied
U.S.	United States
USGS	United States Geological Survey
Z	Zulu time

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